

startgensys

Project title: ADAPTATION KIT DESIGN & MANUFACTURING: APU DRIVING SYSTEM.

Project acronym: STARTGENSYS

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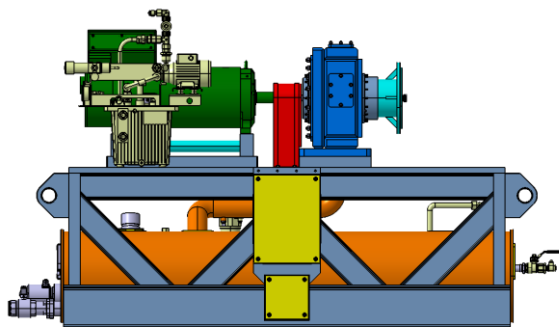
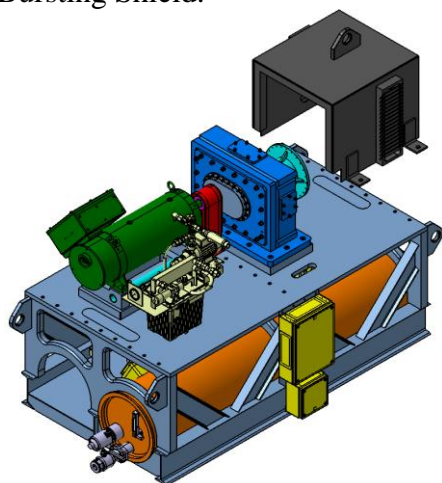
The aim of STARTGENSYS project was to design, manufacture, commissioning and validation of one complete driving system for a ground test bench intended to be used for aircraft starters/generators testing in the frame of Clean Sky programme.

The STARTGENSYS Test Bench, as resulted from design activities, consists in a Control Cabinet, a Power Electronics Cabinet and the Driving System.

For controlling the system, in a local and a remote manner, as well for data acquisition, the Control Cabinet is based mainly on National Instruments components. Specifically, the Control Cabinet has an industrial Panel PC equipped with a high-speed control and data acquisition board. The Control System works with preloaded Torque(Speed) and Speed(Time) characteristics. These characteristics have to be provided, before any test, by the operator directly at the Panel PC or trough Ethernet.

The Power Electronics Cabinet contains the Converter and all electrical facilities and is used to transfer power between the AC input and the Electric Motor in a controlled manner. The power cabinet works in the four quadrants.

The Driving System, which is pictured below, is composed of Supporting Frame, Electric Motor, Gearbox (Speed multiplier), Lubrication and Cooling Group for Gearbox, Motor Cooling System, Low Speed Coupling, High Speed Coupling with Torque Meter, EUT mounting interfaces and a Bursting Shield.



The Supporting Frame is a welded type construction with rectified surfaces for Motor and Gearbox. It incorporates the Lubrication and Cooling Group for Gearbox, the Motor Cooling System and the oil tank.

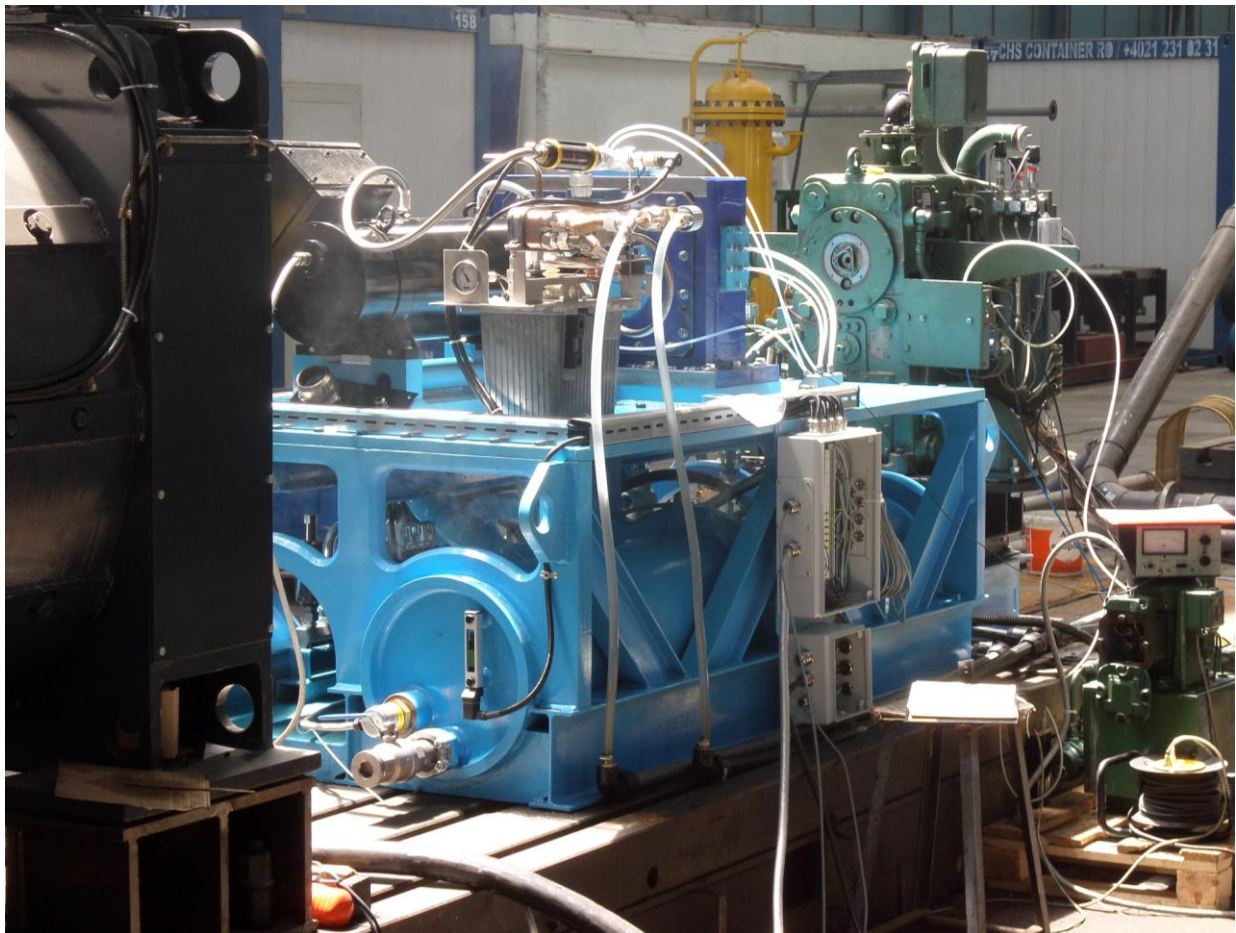
The Gearbox is a cylindrical type, single stage helical gearbox. It is bidirectional, birotational, has recess gears and is capable of max 16000 RPM input, max 51000 RPM output and max 50 Nm. At the low speed shaft, the gearbox is connected to the electric motor through a backlash-free torsion stiff metal bellows coupling. At the high speed shaft, the coupling with the EUT incorporates the torque meter and corrects the centering errors, the solution being based on an elastic beam. The Gearbox case is in welded construction.

For cooling and lubricating the gearbox, an independent Lubrication and Cooling Group (LCG) was designed. The LCG has its own electric motor, works with constant flow mode and will be connected to the Water Network available at the place of use.

The electric motor is a permanent-magnet synchronous motor with the rotor balanced in G1 class. The maximum speed is 16000 RPM and the maximum torque 270 Nm (constant up to 4500 RPM). The maximum torque at 16000 RPM is 80 Nm. A dedicated water-water heat exchanger was incorporated in the supporting frame for motor cooling.

The EUT mounting interfaces accommodate the generator/starter-generator on the test bench and the Bursting Shield covers it during tests for safety purposes.

The factory tests have been performed on different configurations for the entire test bench.



Factory testing setup

Project logo



Project public website

The website address is
www.startgensys-project.eu/

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